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09/859,581

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Spencer Greene

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09/10/2004

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EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 09/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/859,581

Applicant(s)

GREENE, SPENCER

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-17, 20-30 is/are rejected.
- 7) ☒ Claim(s) 6, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5, 10-13, 16-17, 20-24, and 26-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Dasylyva et al. (US Patent Application Publication 2002/0118415 A1).

Regarding claims 1, 13, 24, 27, and 29, Dasylyva teaches a wavelength division multiplexer (402, fig. 4) for multiplexing optical signals (page 4, paragraph 0058), comprising: a plurality of wavelength converters (401, fig. 4 and 300, fig. 3) each receiving one optical input signal (f_m , fig. 3) and an optical pump signal (f_p , fig. 3) and outputting one output signal (f_{out} , fig. 3) having a wavelength shift relative to a wavelength of the input signal (page 4, paragraph 0053); and a coupler (402, fig. 4) combining the output signals (f_0, f_{k1} , fig. 4) from the plurality of wavelength converters (401, fig. 4) into a multiplexed signal (page 4, paragraph 0059).

Regarding claim 2, Dasylyva teaches each of the converters receive different input signals (f_0, f_i , fig. 4), and outputs the signals (f_0, f_{k1} , fig. 4) to the coupler (402, fig. 4).

Regarding claims 3 and 16, Dasylyva teaches each of the output signals has a different wavelength ($f_0, f_{k1}, f_{k[(w-1/k)]}$, fig. 4).

Regarding claims 4 and 17, Dasylyva teaches n input optical signal (f_0, f_i , fig. 4) passing through a unique set of converters (401, fig. 4 and page 4, paragraphs 0059, 0060, 0061).

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Regarding claim 5, Dasylda teaches $n^{1/a}$ wavelength converters (303, 306), when $(n^{1/a})$ is an integer greater than 1 (when $(n^{1/a})$ is an integer greater than 1, for example 2, there are two wavelength converters such as converters 303 and 306).

Regarding claims 10 and 21, Dasylda teaches a plurality of pump lasers (f^p_1 , fig. 3) being connected to the converters (note that each wavelength converter 303 receives a pump frequency f^p_1).

Regarding claims 11 and 20, Dasylda teaches the frequency of the output signal by the wavelength converter is a constant multiple of a frequency of the optical pump signal minus a frequency of the optical input signal (305 and $f^{l}_{out} = f^p_1 - f_{in}$, fig. 3).

Regarding claim 12, Dasylda teaches the optical input signals have a common wavelength and the wavelength of the output signal is shifted relative to the common wavelength input signal (page 4, paragraphs 0059, 0060, 0061).

Regarding claims 22-23, 26, and 28, Dasylda further teaches a second group of wavelength converters (wavelength converters 306 that are connected to the first converters 303) receiving the n wavelength shifted output signals from the first group of converters (note that wavelength converter 306 gets the shifted output signal from the first converter 303) and outputting n second output signals (the output signals from respective converters 401 each having a wavelength converter circuitry such as converter 300 of fig. 3) having unique wavelengths (page 4, paragraph 0058).

Regarding claim 30, Dasylda teaches one or more network devices such as switches (for example, the 2x2 space switches of fig. 19) to produce n optical input signals for routing the signals to wavelength converters, or frequency shifters (frequency shifters in fig. 19), and output

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network devices such as switches or multiplexers (for example, the output switch or the multiplexer of fig. 19) to receive the n optical signals.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dasyuva et al. (US Patent Application Publication 2002/0118415 A1) in view of Peterson et al. (US Patent No: 4,880,996).

Regarding claim 7, Dasyuva differs from the claimed invention in that Dasyuva does not disclose the wavelength converter includes a nonlinear crystal. Peterson teaches a wavelength converter (col. 1, lines 20-27, col. 2, lines 63-68, col. 3, lines 1-36 and fig. 1) that includes a nonlinear crystal (130, fig. 1). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a wavelength converter with a nonlinear crystal such as the ones of Peterson for each wavelength converters in the optical transmission system of Dasyuva in order to provide a high wavelength conversion efficiency.

5. Claims 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dasyuva et al. (US Patent Application Publication 2002/0118415 A1) in view of Suzuki (US Patent No: 6,324,318).

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Regarding claims 9 and 15, Dasyuva differs from the claimed invention in that Dasyuva does not disclose an amplifier connected to the coupler to amplify the multiplexed signal. Suzuki teaches multiplexed optical signals (14, fig. 2) are amplified (15, fig. 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate an optical amplifier such as the one of Suzuki for the optical transmission and multiplex system of Dasyuva in order to amplify and boost the signal strength of converted multiplexed optical signal to further increase the transmission distance.

6. Claim 8, 14, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dasyuva et al. (US Patent Application Publication 2002/0118415 A1) in view of Peterson et al. (US Patent No: 4,880,996) and in further view of Furusawa et al. (US Patent No: 6,636,342).

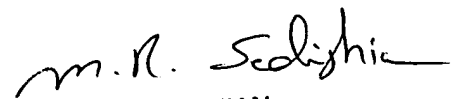
Regarding claims 8, 14, and 25, the modified optical transmission system of Dasyuva and Peterson differs from the claimed invention in that Dasyuva and Peterson do not disclose a filter connected to the output of the nonlinear crystal. Furusawa teaches a plurality of optical converters (col. 3, lines 50-67, col. 4, lines 1-9 and 3, fig. 1) that are connected to a plurality of optical filters (4, fig. 1). Therefore, it would have been obvious to an artisan at the time of invention to incorporate optical filters such as the ones of Furusawa in the modified optical transmission system of Dasyuva and Peterson in order to eliminate the unwanted signals.

7. Claims 6 and 18-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (571) 272-3034. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


M. R. SEDIGHIAN
PRIMARY EXAMINER